Integrating landscape services into policy and practice – a case study from Switzerland

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Abstract

Like ecosystems, landscapes provide vital services to people. However, often those services are not or only partly incorporated into landscape policy. This applied research project explores how stakeholders in landscape policy work with a Landscape Services (LS) approach. Our LS definition builds upon the Ecosystem Services (ES) definition and includes four LS with high relevance to Switzerland. We explicitly use the term 'landscape' instead of 'ecosystem' to underline multiple dimensions besides ecological issues. A transdisciplinary process with stakeholders from government agencies, trade associations, research institutes and civil society was initiated to discuss possibilities of policy integration of these LS. Best practice examples were debated and ways to better consider LS within existing policy instruments were discussed. We conclude that the results of our research and the transdisciplinary process have enabled numerous stakeholders to build the groundwork for pursuing initiatives to better recognise and ensure LS in Switzerland.

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1 Introduction

Providing relevant information and tools to support policy implementation of Ecosystem Services (ES) is one of the main goals of global platforms such as the 'Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)' (IPBES, 2016a) or the European initiative 'Mapping and Assessment of Ecosystems and their Services (MAES)' (MAES, 2016). This paper aims to illustrate challenges relating to the integration of concepts that link nature/landscape with human well-being into policy. We illustrate this with the case of Switzerland's landscape policy.

1.1 Landscape Services in relation to Ecosystem Services

Focusing on policies regarding landscape development, we use the term Landscape Services (LS) instead of ES because of its better acceptance within the landscape planning community (Fagerholm, Käyhkö, Ndumbaro, & Khamis, 2012; Termorshuizen and Opdam, 2009). Having mentioned this, the term of LS still needs further clarification, as different definitions of LS exist. Recent research on LS has focussed on how to categorise LS (Vallés-Plannels, Gliana, & Van Eetvelde, 2014); how to conceptualise LS in order to make it as powerful as ES (Fang, Zhao, Fu, & Ding, 2015), or how to quantify or map LS (Aretano, Petrosillo, Zaccarelli, Semeraro, & Zurlini, 2013; Bryan, Raymond, Crossman, & Hatton Macdonald, 2010; Castro et al., 2014; Havas, Saito, Hanaki, & Tanaka, 2016). Most of this research about LS tries to build bridges to the (still) extensive debate about ES. Although we recognise the advantages of taking into account the results of ES research, we will point out that, although they sound similar, LS and ES stem from two quite different approaches. Furthermore, as

Antrop (2005) pointed out, the importance of landscapes for human well-being was extensively discussed long before conceptions such as ES and LS appeared. There are, indeed, other attempts to broaden ES, such as the Social-Ecological Systems framework (Anderies, Janssen, & Ostrom, 2004; Janssen et al., 2006) or the related concept of panarchy (Allen, Angeler, Garmestani, Gunderson, & Holling, 2014), which concentrates more on vulnerability and resilience.

What are the linkages between LS and ES? Current ES literature provides a great variety of views about commonalities and differences between ES and LS. The Millennium Ecosystem Assessment (MA) (2005) describes landscapes as an area of land containing a mosaic of different ecosystems, including human-dominated ecosystems. De Groot et al. (2010) and Kienast (2010) do not distinguish between ES and LS-. Vallés-Plannels et al. (2014) propose changing existing ES classifications in order to include LS more appropriately. Bastian et al. (2014) see a complex interdependence between LS and ES that deserves more attention. One reason – among others – to address LS is because of their relevance for planning purposes. Termorshuizen and Opdam (2009) also highlight this issue and further refer to the wider acceptance of the term 'landscape' in relation to 'ecosystem'; 'landscape' is used for all kind of areas, whereas 'ecosystem' is often associated with protected areas and biodiversity (Fagerholm, et al., 2012).

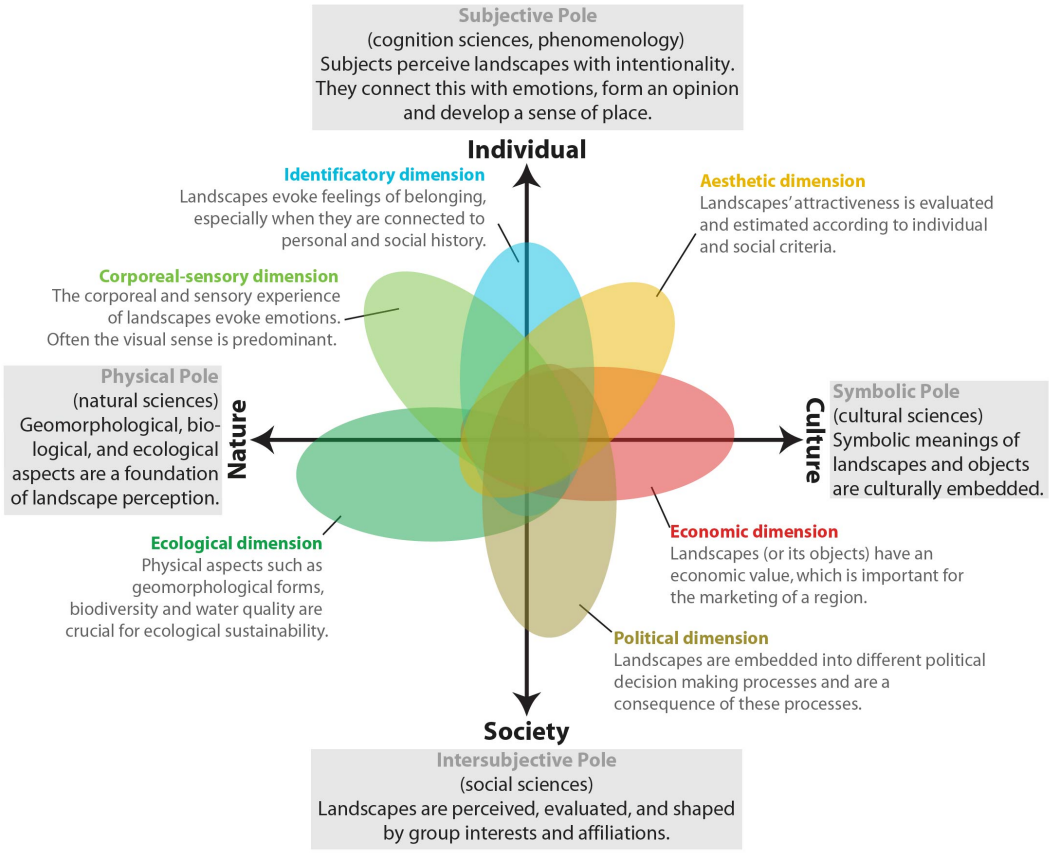
We see essential differences between LS and ES regarding their conceptual approaches. According to Grunewald and Bastian (2010), the term 'ecosystem' can be traced back to Tansley (1935), who introduced it as a founding principle of ecology. The Swiss Biodiversity Strategy describes an ecosystem as a 'dynamic complex consisting of a community of flora, fauna and microorganisms and their inanimate environment which interact with each other' (Swiss Federal Council, 2012, p. 79). An

ecosystem approach thus focuses on ecological interactions and can be described as shaped by natural science. On the other hand, a landscape approach opens different doors. The European Landscape Convention (ELC) describes a landscape as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors' (Council of Europe, 2000, p. Article 1). An approach through 'landscapes' includes, therefore, a multitude of disciplinary inputs, including views from both natural and social scientists and experts outside academia. We believe that this potential for transdisciplinary collaboration is a very important issue for LS use in landscape policy.

1.2 Landscape Services related to landscape perception

Our understanding of landscapes and their interrelation with human well-being is based on the so-called '4-pole model' which has been developed for the synthesis of the National Research Programmes (NRP) about 'Landscapes and Habitats of the Alps' (Backhaus, Reichler, & Stremlow, 2007, 2008). This 4-pole model describes how landscape perception occurs between the poles of nature and culture as well as between the individual and society (see Figure 1).

Figure 1. The 4 poles and 6 dimensions of landscape perception



Source: Adapted from Backhaus, et al. (2008)

Within the fields spanned by these four poles, the authors have distinguished six different dimensions of landscape perception that can be regarded as different (but mostly overlapping) viewpoints: 1) the *corporeal-sensory dimension* is about sensory impression, perception, and bodily experience; 2) the *aesthetic dimension* addresses beauty or intellectual discoveries and sensations; 3) the *identificatory dimension* concerns the feeling of belonging; 4) the *political dimension* highlights the different needs and desires of interest groups; 5) the *economic dimension* reveals the importance of landscapes as economic resource e.g. for tourism; and 6) the *ecological dimension* concerns all aspects of ecological aims of sustainable development (Backhaus, et al., 2008). Based on this model, we aim to show the importance of a comprehensive view on landscapes and the challenges related to policy implementation.

1.3 Why focus on human perception?

Our research is led by the interest of how an approach focussing on human well-being – instead of conserving landscapes for their own sake – might change existing landscape policies and practices. Building on the understanding of landscapes promoted by the European Landscape Convention (ELC), we focus on LS that are related to human perception like aesthetic appreciation, sense of place, recreation and enjoyment. We believe that despite the crucial importance of these LS for human well-being, they have often been neglected in landscape policies and practices due to difficulties in fully understanding them (unlike other LS like the provision of food or water purification). The challenges are similar to those within the category of so-called Cultural Ecosystem Services (CES) because human perception is difficult to quantify, as Chan et al. (2012a; 2012b) and Fish et al. (2016) describe.

1.4 Definitions of Landscape Services

Besides the discussion about the linkages between ES and LS, recent scientific debates have arisen about how to conceptualise LS in a way to be able to promote it similarly to ES (e.g. Fang, et al., 2015) and about how LS can be quantified and mapped (e.g. Havas, et al., 2016). An interesting contribution to the conceptualisation of CES is made by Fish et al. (2016): they see CES as an interplay between environmental spaces and cultural practices that provide benefits for human well-being and shape the biophysical domain. Similar to our claim about LS, they highlight the need to engage with wider fields of study when analysing CES, including methods, concepts and traditions to describe "*environmental phenomena and processes in cultural terms*" (Fish, et al., 2016, p. 215).

For creating a clearer definition of LS, we can build on previous studies. Within Switzerland, different policy-related contributions have proposed definitions of LS, two

stemming from National Research Programmes (Grêt-Regamey, Neuenschwander, Wissen Hayek, Backhaus, & Tobias, 2012; Knoepfel and Gerber, 2008) and one from the landscape strategy of the Swiss Federal Office for the Environment (BAFU, 2011). All three definitions use different terms and focus on different aspects. The commonalities lie on the use and benefit of landscapes for humans. We therefore propose the following definition which is based on three aspects: 1) anthropocentric view (i.e. focus on human benefits); 2) landscape as public good; 3) mentioning specific landscape benefits (or LS):

Landscape Services have direct economic, social and mental benefits for individuals and the society. Landscape Services are often seen as public goods. Benefits of Landscape Services include aesthetic appreciation, possibilities for identification and sense of place, recreation and health, as well as attractiveness of the location. Adequate landscape qualities constitute the spatial foundation for biodiversity and ensure the capability of the regeneration of natural resources (Keller and Backhaus, 2017, p. 19 (own translation)).

1.5 Our case study: Switzerland

Switzerland is a federal state with 26 cantons (states) and over 2000 communes. Responsibilities are divided between the confederation, cantons and communes. Within the Federal Constitution of the Swiss Confederation, the main policy relating to landscapes is Article no. 78. This article was introduced into the federal constitution in 1962 and led to the Federal Act on the Protection of Nature and Cultural Heritage (NCHA) in 1966. This federal act is still valid – it has been adopted and extended several times – and represents the main tenet of landscape policy on the national level besides the Federal Act of Land Use Planning (LUPA). Landscape-relevant articles are also contained in the Federal Act on Agriculture, Federal Act on Forest and the Federal

Act on the Protection of Waters. Switzerland also ratified the European Landscape Convention (ELC) in 2012.

Both the NCHA and the LUPA build the basis for landscape policy in Switzerland on the national level and frame the legislation on cantonal or communal level. On the national level, there is quite a strong distinction between 'landscape policy' and 'biodiversity or ecosystem policy': The term 'landscape' has been used since the 1990s as an overall idea for all issues related to landscape, nature, species and biodiversity. This view was incorporated into the 'Swiss Landscape Concept' (BUWAL and RPG, 1998) that presented a holistic view of the multifunctionality of landscapes (i.e. as natural areas, cultural areas, economic areas). With the emergence of the global debates about biodiversity (e.g. Millennium Ecosystem Assessment) and creation of platforms such as IPBES, the focus has shifted more towards ecological issues. A countermovement can be observed due to the ongoing implementation of ELC that has strengthened the efforts of regaining a holistic view in landscape policies again (Hammer and Siegrist, 2016).

In the next section, we explain the methods we used to conduct this transdisciplinary research. In section 3, we describe specific LS that are relevant for Switzerland and present our findings regarding operationalisation and measurement of LS. Section 4 contains the discussion of our results and in section 5, we draw conclusions and suggest recommendations for landscape policy stakeholders.

2 Methods

As a first step, we identified landscape-relevant paragraphs in regulatory frameworks (federal constitution, national law – see introduction section) and policy instruments (strategies, inventories) of our case study. Steiger (2016) provides an overview of more than 30 landscape policy instruments at different levels of governance in Switzerland

and distinguishes between superordinate strategies, landscape strategies, inventories, land use planning instruments, agriculture and forest management instruments, water instruments, valuation instruments and monitoring.

On the basis of the 4-pole model (Backhaus, et al., 2007, 2008), we analysed how the different landscape dimensions are addressed by those legal documents and policy instruments. We gathered keywords for each of the six dimensions and compared them with the relevant text passages. In summary, legal texts that were introduced within the last decade tend to explicitly mention details about different landscape dimensions, while legal texts from the 1960s seem to be more general or focus primarily on ecological aspects. However, this impression is misleading, since the legal commentary on the NCHA clearly states that 'landscape' is *the* central place for all activities related to nature conservation, landscape protection and cultural heritage (Rohrer, 1997). The landscape policy instruments analysed mostly take a broad understanding of landscape – unless they focus on one specific dimension like landscape aesthetics. Most landscape policy instruments in Switzerland have the potential to address a multitude of different landscape dimensions. However, whether they focus on specific dimensions or have a comprehensive view depends on their applications (and the stakeholders involved).

Besides our analysis of current scientific publications (Bieling and Plieninger, 2012; Hunziker, 2016; Stephenson, 2010; Tobias, 2015), we included legal texts, policy strategies and reports mentioning LS in Switzerland. Descriptions of LS are also part of two national landscape typologies, one developed by Swiss Federal Offices (ARE, BAFU, & BFS, 2011a, 2011b, 2011c) and the other by the Swiss Foundation for Landscape Conservation (Rodewald, Schwyzer, & Liechti, 2014). Both typologies are currently used by landscape professionals to describe regional landscape qualities and

can therefore be seen as policy-relevant. In addition, we also analysed how recent studies in Switzerland have operationalised and measured different LS (Flüeler, 2015; Kienast, Frick, & Steiger, 2013; Kienast et al., 2017).

We contacted 21 experts who are involved in measuring or handling LS, including public authorities, professional associations, foundations, and promoters of arts and culture. All experts were contacted by e-mail and around 1/3 were interviewed over the phone or in person. They were informed that none of their replies would be directly cited in the project report, since many experts felt uncertain about this still-developing topic of LS. Findings were therefore summarized according to the content of the project report but without direct reference to the experts.

Some experts have measured LS for their own research projects; others were trying to use LS data for spatial planning. Most experts, however, showed great interest in LS but did not have direct experience in applying them. Their main interest was the possibility to address issues that receive little attention within political or planning processes but are considered important. For example, one interviewee expressed the hope that the naming of LS would raise awareness of how strongly human well-being depends on high landscape qualities.

As it was the goal to discuss the findings with stakeholders from different institutional backgrounds, a transdisciplinary workshop was organised with more than 20 participants from government agencies, NGOs, trade associations, research institutes and civil society. We regard transdisciplinarity as an approach to combine scientific knowledge from different disciplines with practical knowledge from stakeholders outside academia (Pohl and Hirsch Hadorn, 2006). The workshop was facilitated by a transdisciplinarity specialist experienced in moderating. The workshop participants received written preparatory documentation prior to the workshop and short oral inputs

during the workshop. Four focus groups discussed possible policy applications of LS as well as risks and opportunities related to policy integration of LS. Workshop participants presented, discussed and further refined the focus group results.

All workshop participants and interested experts were asked to comment on the draft of the project report and many provided helpful inputs leading to policy recommendations. These inputs were discussed with representatives from the Federal Office for the Environment.

3 Results

As pointed out, there are many uncertainties about the core meaning of Landscape Services and their potential policy applications. One of the challenges of this research was therefore to provide a definition that includes state-of-the art scientific knowledge but still can be understood by stakeholders with different professional backgrounds (see section 1.4).

3.1 Specific LS for Switzerland: Operationalisation and measurement

Similar to the different definitions of LS, there are multiple ways to identify LS (e.g. Vallés-Plannels, et al., 2014). Following the broad landscape definition of the ELC and the focus on human perception, we propose the identification of specific LS for Switzerland as presented below. Our classification is related to the '4-pole model' (Backhaus, et al., 2008) and includes distinctions used in landscape typologies (ARE, et al., 2011a; Rodewald, et al., 2014) as well as suggestions provided by the landscape strategy of the Federal Office for the Environment (BAFU, 2011). We do not emphasise the ecological dimension of landscape because, although biodiversity is of utmost importance for LS, it is already a defining part of ES and of biodiversity policies, which are not addressed here. Our focus thus lies on LS with direct economic, social and

mental benefits for individuals and the society. Based on discussions with the Federal Office for the Environment FOEN we identify the following LS:

- Aesthetic appreciation
- Possibilities for identification and sense of place
- Recreation and health
- Attractiveness of the location

One possibility to distinguish and describe attributes of these LS is by using the 'Cultural Values Model (CVM)' developed by Stephenson (2006, 2008). She describes the basic components of the CVM as follows: forms capture physical, tangible and objective aspects of landscapes like natural features; practices relate to activities and processes associated with a landscape; and relationships can be represented in spirituality, myth and sense of place but also encompass ecological and functional relationships (Stephenson, 2006, p. 45). Bieling et al. (2014) used the CVM to analyse interview data about influences of landscape on human well-being. In his study about Ecosystem Services in Switzerland, Keller (2017) described three different CES with the help of CVM and distinguished the basic components for each of the three CES. For our study, we use the three basic components *forms*, *practices* and *relationships* suggested by Stephenson (2006, 2008) to classify the more than 360 different attributes that were used to describe LS in the 'Catalogue of characteristic cultural landscapes in Switzerland (CCLS)' (Rodewald, et al., 2014). About 40% of the attributes used within this catalogue describe forms, practices and relationships of landscapes simultaneously. Another 40% are used for two categories at the same time and 20% are only used for one category. The distinction in forms, practices and relationships is a helpful way to differentiate the characteristics of a landscape. But as shown, the categories are not

selective and many attributes can be assigned to at least two different categories at once. The same is true for the different LS: one attribute can be used to describe e.g. aesthetic appreciation but at the same time also recreation and health.

Because of overlapping and non-exclusive descriptions of LS, measurement of LS proves to be challenging. However, the Swiss Landscape Observatory Programme (LABES) combines landscape indicators about 1) physical landscapes; 2) evolutionarily determined landscape perception; 3) culturally determined landscape perception and 4) land use (Kienast, Frick, van Strien, & Hunziker, 2015). The sociocultural indicators stem from a nationwide survey and include aspects such as fascination, perceived landscape beauty and authenticity. First results from landscape perception indicators were published in 2013 (Kienast, et al.) and they provide an interesting data set that can be analysed for different regions or sociodemographic factors like age, gender or housing situation[1].

Another research project focused on LS provided by Swiss waterfalls and included 12 different criteria with 30 indicators from physical aspects (like water volume) to aesthetic aspects (like sensual experience) (Flüeler, 2015). According to Flüeler, this method proved to be suitable for planning processes as well: It provides helpful insights to understand the importance of different landscape attributes. But it is a time-consuming method as it involves visits in the study area and interviews with local stakeholders.

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[1] See http://www.bafu.admin.ch/umwelt/indikatoren/index.html?lang=en (Access: 12.01.2017) for an overview of all indicators explained and evaluated by the Federal Office for the Environment.

Another study focuses on conflicts between LS and decentralised renewable electricity production in Switzerland: Kienast et al. (2017) provide examples for spatially-explicit LS derived from existing observatory data. The authors have used a 'look-up table' approach to map the following LS: nutrition (biomass); materials (biomass); aesthetic aspects of landscapes; physical and experiential interactions; heritage and symbolic content; water and liquid flows; and lifecycle maintenance, habitat and gene pool protection.

Hence, a wide variety of existing methods and data on LS measurements is available. Our discussions with practitioners revealed, however, the need for further investigation in how to explain sociocultural meanings of landscapes on a regional or local level. Existing data from national observatories provide an important overview, but they cannot fully cover regional or local needs.

3.2 Policy relevance of LS

During the transdisciplinary workshop, the participants discussed the aforementioned four LS in-depth in small groups. We were especially interested in the following issues: How can these LS be recognised and secured in policies? Which policy instruments can be used to do so? Which stakeholders and processes need to be involved? Within each group, participants posted their key issues on a flip chart and presented them to the plenary afterwards. All outputs were protocolled and analysed.

Regarding the four LS identified before, we have summarised the following information:

- **Aesthetic appreciation**

Landscape characteristics and their aesthetic appreciation can be surveyed. Depending on the region and on the sociocultural background of the respondents, varying responses may be expected.

Workshop participants mentioned that ‘beauty’ can be seen as a superordinate concept and that appreciation or enjoyment is often linked to specific experiences with landscapes. It would be desirable to create visions of eligible landscape qualities for specific regions. Already existing supporting tools like the ‘Landscape typology Switzerland’ need to be adapted to the local level and include more landscape qualities.

- **Possibilities for identification and sense of place**

This landscape service may generate different requirements according to the sociocultural background of people (age, origin etc.). It is therefore crucial to know these requirements, to differentiate between diverse stakeholders and to highlight possible contradictions.

During the workshop, participants emphasised to vivify public spaces to create a feeling of belonging. Public participation through cultural activities or planning processes is also important. Awareness for this service can be raised with awards (e.g. for attractive town centres or landscapes) or by developing marketing strategies to promote the attractiveness of the location.

- **Recreation and health**

There seems to be a need for stronger sensitisation on the communal level: Landscape qualities are often neglected when planning work or residential environments. Positive effects of landscape elements like green spaces or water on human well-being are not yet fully incorporated into health, youth or age policies.

Planning instruments and policies should be used to plan recreation areas more consciously and to better combine different spatial requirements.

- **Attractiveness of the location**

Highly qualified employees are mobile and usually work at places with a good quality of work and life. Attractive residential areas, recreation qualities and aesthetic qualities are of utmost importance for the attractiveness of the location. Switzerland as a 'premium location' is therefore relying on unique and manifold landscapes.

Discussions at the workshop and follow-up interviews with experts have shown that the above-mentioned LS are considered very relevant for Switzerland but are insufficiently addressed by different stakeholders. In general, there seems to be a gap between the LS offered by landscape producers (e.g. farmers, property owners) and LS demanded by landscape consumers (e.g. residents, tourists). It was often stated that there is a need for raising awareness about LS. Many stakeholders involved in planning processes (e.g. public authorities, planners and engineers) need to be sensitised to specific landscape qualities and they need to know how to respect those qualities to sustain LS. Many experts, therefore, suggest increasing awareness-raising measures and further education for different stakeholders. At the same time, practical advice of how to sustain and improve specific LS is desired, be it through best practice examples or guidelines. While creating these support tools, it should be considered that users of these tools are rarely landscape experts. It is therefore essential to reach the target groups with language appropriate for a general audience (Keller and Backhaus, 2017).

4 Discussion

The definition of LS used for this study was presented to stakeholders from government agencies, trade associations, research institutes and civil society during a

transdisciplinary workshop. Discussions at the workshop showed that the definition proved to be helpful to understand the implications of LS, as it evoked lively debates about how to better consider LS in different policy areas.

Compared to other definitions of LS (e.g. Bastian, et al., 2014; Vallés-Plannels, et al., 2014) or to ES classifications (e.g. MAES, 2016; Millennium Ecosystem Assessment, 2005), our definition has a very specific focus on human perception such as the category of cultural services and therefore excludes other categories like regulating or provisioning services. However, we do not regard this as a disadvantage: by mentioning the spatial foundation for biodiversity and the ability for the regeneration of natural resources, it is easily possible to link this definition to other (already existing) definitions or classifications of LS and ES. We see the main differences between LS and ES both in conceptual approaches and general comprehensibility. ES has a stronger focus on (natural) science aspects such as species, while LS is more a social science approach that focusses on human perception. Moreover, landscape is a common expression, that people understand better than the term 'ecosystem'.

Although there are many different data sets available characterising landscapes and their values in Switzerland (e.g. Kienast, et al., 2015), the operationalisation of LS remains a challenge. Data for physical aspects of landscapes and services, such as size of forest areas or soil sealing, are available for almost all map scales. Yet, this is not the case for sociocultural or intangible LS. Available data from LABES and from the Federal Statistical Office can be evaluated by comparing regional disparities such as language areas or biogeographical regions and by sociodemographic factors such as age and housing conditions. But due to its sample size, LABES data cannot be analysed per landscape type or per community. Therefore, existing sociocultural landscape indicators

can be valuable to know about general conditions, but further enquiries are needed to evaluate those LS on a regional or local level.

The Cultural Values Model (CVM) (Stephenson, 2008) helps to describe landscape attributes and is therefore useful to explain the different characteristic of LS. The 'Landscape typology Switzerland (LTS)' (ARE, et al., 2011a, 2011b, 2011c) and the 'Catalogue of characteristic cultural landscapes in Switzerland (CCLS)' (Rodewald, et al., 2014) have only been developed and promoted recently, and it is too early to say if they are to be helpful or not. They are currently being used to formulate LS-related targets on local and regional levels and to develop landscape quality projects. For example, Swiss agricultural policy implemented landscape quality fees in 2014 where farmers get paid to enhance the landscape quality e.g. by repairing stone walls or planting traditional fruit trees (BLW, 2015). Whether this instrument is helpful for increasing landscape qualities is currently debated (Keller, 2017).

The four identified LS (aesthetic appreciation, possibilities for identification and sense of place, recreation and health, and attractiveness of the location) seem to be important issues that – according to the consulted experts – need to be better addressed within current policies. Is this possible within the existing policy instruments? Yes: our analysis of the regulatory frameworks and policy instruments (Steiger, 2016) indicates that they offer the potential to deal with LS. Feedback from policy experts points in the same direction. The most difficult part of policy implementation is therefore not the nonexistence of appropriate frameworks and instruments but rather the lack of awareness. Many different stakeholders need to work together in order to preserve these LS, e.g. even within public authorities, several departments need to cooperate in order to ensure high landscape qualities for recreation and health. Seeking solutions off the

beaten track requires a common understanding and recognition of existing challenges and goals.

5 Conclusion

We have explored how Landscape Services can be defined and distinguished in Switzerland and how these LS could be integrated into Swiss landscape policies. Our focus was primarily on those LS that are based on human perception and that are sometimes referred to as intangible or cultural services. We explicitly used the term 'landscape' instead of 'ecosystem' to underline the multiple dimensions of this approach besides ecological issues. The definition of LS developed during this project highlights the benefits of landscape qualities for individuals and society. It also stresses the characteristics of LS as often being public goods which are 'produced' by different stakeholders such as farmers or planners but are 'consumed' by everyone – although not necessarily in the same way. Through regular exchange with representatives from the Federal Office for the Environment, it was possible to distinguish four different LS that we used throughout the project: aesthetic appreciation, possibilities for identification and sense of place, recreation and health, attractiveness of the location.

Through the analysis of regulatory frameworks and policy instruments relating to landscapes, we were able to elaborate possibilities of policy inclusion of LS. Our findings show that there is no urgent need for additional policy instruments. However, it is necessary to better focus the existing frameworks and instruments to address LS issues. It is, for example, possible to improve landscape patterns to allow for better recreation while protecting wildlife at the same time. In order to do so, stakeholders from different backgrounds and with potentially different goals need to work more

closely together. Naming and describing LS – as is done in this project – may be a way to bring diverse stakeholders together because common benefits become apparent.

In order to enable stakeholders to express their viewpoints, the involvement of transdisciplinarity experts is helpful. Our transdisciplinarity approach included a workshop and expert interviews with stakeholders from government agencies, trade associations, research institutes and civil society. Nevertheless, this alone is not enough to bundle different knowledge systems. Scientists also have the duty to be open to different viewpoints and to ~~be able to~~ synthesise them in a way where they remain understandable and feasible for everyone. This is a challenging task. At the same time, this kind of transdisciplinary work is not being fully appreciated within academia: it allows research results to be challenged by practical experiences and knowledge that may not be (fully) scientifically grounded. Results or recommendations stemming from transdisciplinary processes may therefore often be situated at the borders between scientific disciplines and knowledge systems outside academia.

From a scientific viewpoint, we regard the following points as the most pressing needs related to LS policy uptake. First, further support is needed to describe landscape qualities. Existing landscape characteristic from regional and local levels should be analysed. It can be expected that they rather consider geomorphological and ecological aspects due to data availability but neglect LS related aspects. Examples from outside Switzerland (e.g. Natural England, 2014) provide assistance in developing practical guidelines. Second, to name specific LS hotspots on local or regional level, landscape-related needs of residents and visitors with different backgrounds (e.g. age, gender, origin) and stakeholders (e.g. tourism, farmers, nature conservation) need to be collected and analysed. A subsequent transdisciplinary process helps to establish visions for further local and regional development while putting LS in value.

Relating back to the broader issue of how to integrate the idea of LS into policy and practice, we argue that the benefit-oriented approach of using LS as argumentation for landscape qualities has potential. Based on our results, we see a potential to address and sensitise stakeholders by using an LS approach as additional argument. This does not yet ensure that the offer of landscape producers meets the needs of landscape consumers. But awareness-raising and further education of stakeholders about LS and their direct economic, social and mental benefits for individuals and society is of utmost importance.

In our case study, we focussed on one specific policy area in one country. However, research about policy uptake of LS and ES has so far provided only few examples of how LS or ES could be applied in 'real-world' decision making (e.g. Grêt-Regamey, Altwegg, Sirén, van Strien, & Weibel, 2017; Ruckelshaus et al., 2015). Findings of European research projects like OPERAs (http://www.operas-project.eu) and OpenNESS (http://www.openness-project.eu) provide some guidance, but their transferability to different contexts and locations remains difficult. IPBES has not yet provided a catalogue of policy support tools but intends to present its findings by 2019 (IPBES, 2016).

A global catalogue of policy support tools as intended by IPBES seems challenging because of transferability issues. Nevertheless, it could provide some instructions on factors of success and therefore be useful. We believe that it is feasible to continue policy uptake of LS or ES in different contexts if interrelated challenges and opportunities are transparent to all stakeholders.

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